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Frauke H. Peter • C. Katharina Spiess

The bigger the children, the bigger the worries – Are preschoolers and adolescents affected differently by family instability with regard to non-cognitive skills?

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German Socio-Economic Panel Study (SOEP)
DIW Berlin
Mohrenstrasse 58
10117 Berlin, Germany

Contact: Uta Rahmann | soeppapers@diw.de

The bigger the children, the bigger the worries –

Are preschoolers and adolescents affected differently by family instability with regard to non-cognitive skills?

Frauke H. Peter and C. Katharina Spiess

German Institute for Economic Research (DIW Berlin) and Free University of Berlin

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DIW Berlin

Mohrenstrasse 58

10117 Berlin

Germany

Emails: fpeter@diw.de, kspiess@diw.de

Phone: +49 30 89789-468; -254

Fax: +49 30 89789-109

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Abstract

Substantial research on the relationship between family structures and child outcomes represents a considerable part of the literature. However, family structure provides a rather static view of the relationship of children's living arrangements and their well-being, revealing hardly anything about the stability of a family for a longer period. This paper focuses on the impact of family instability on children. In light of human capital accumulation, we hypothesize that a stable family (either a two parent or a single parent family) might be beneficial for child outcomes, in particular for non-cognitive skills. We use skills, such as socio-emotional behavior or locus of control, as our primary measure of child outcomes. The paper focuses on the potential impact of family instability occurring at different childhood stages on non-cognitive skills of preschoolers (aged five to six) and of adolescents (aged seventeen). Our analysis is based on data from the German Socio-Economic Panel Study (SOEP). Family instability is defined by yearly observed maternal partnership variations. Our results suggest that differences in family stability account for some of the gradient in social-behavioral difficulties for preschool children. By using sibling differences for our adolescents' sample, we find that multiple partnership transitions experienced early in life are negatively correlated with non-cognitive skills in adolescence, e.g., such adolescents are less likely to be active or self-determined in life.

JEL classification: J10; J12; J13

Keywords: child development, family dynamics, locus of control, non-cognitive skills

1 Introduction

Substantial evidence demonstrates that children's skills are influenced by family characteristics, such as parental education and income, as well as other factors that are part of the family environment. It appears that family related factors forming a child's environment are of particular importance, perhaps more important in explaining child outcomes than the environment of other caretaking institutions, such as day care centers or schools (for instance, Carneiro and Heckman 2003).

A vast literature focuses on the relationship between family structures and child outcomes (for instance, Del Bono et al. 2007, Ermisch et al. 2004, Francesconi et al. 2008 and 2010, and Mahler and Winkelmann 2004). However, family structure provides only a snapshot of children's living arrangements, revealing little about family experiences during childhood. But "as children are increasingly dispersed across a variety of family structures, some of which are more stable than others, it is important that researchers explicitly take account of the dynamics of family living arrangements across childhood" (Brown 2010: 1066). Family stability is as important for child wellbeing as family structure and has both immediate and long-term benefits for children (for a literature overview see below). Along these lines, this paper focuses on the impact of family instability for children during their early years (from birth until the age of six) and for children during early years until adolescence (from birth until the age of seventeen) on one particular child outcome, namely non-cognitive skills. The study uses German data and thereby focuses on a country with fewer divorces than the US, but with still an increasing percentage of children being affected by divorce (Statistisches Bundesamt 2009, US Census Bureau 2011).

We concentrate on family instability by depicting multiple transitions in maternal partnerships. Thus the purpose of this paper is to analyze if children whose mothers have unstable partnerships have different outcomes than children who live with mothers who do not separate or newly cohabit. On the one hand, one might hypothesize that family instability affects child outcomes negatively. For instance, Fomby and Cherlin (2007) argue that multiple partner changes might cause more stress to children than living in a stable single parent household. On the other hand, some authors argue that this depends on whether the child anticipates separations (Amato 2005). Consequently, focusing on the mechanisms through which family instability affects child outcomes is important.

Different theories, such as stress theory, social control theory or economic hardship theory, explain how changes in family environments affect child development (for such an overview, see Hill et al. 2001). Stress theory states that family reorganization, prompted by parental separation or (re)marriage, is stressful for parents and children with the resulting weakening of emotional security and bonds thought to encourage problem behaviors in children (Fomby and Cherlin 2007, Sweeney 2007). In social control theory, adult supervision and monitoring of children is considered as important means to keep children from engaging in problematic behavior. Key aspects of this theory are number and types of adults overseeing children (Hill et al. 2001: 274). The more distant the relationship of the adult to the child, the weaker the social control. Economic hardship theory states that income varies with household composition and that a change in family structure decreases or increases income respectively (Fomby and Cherlin 2007, Hill et al. 2001 and Sweeney 2007). Child development and, in particular, outcomes, might be negatively affected if multiple transitions are experienced during childhood. A higher number of transitions will likely impose aspects of all three theories on a child's life (see, for an example, Sweeney 2007). However, it is difficult to distinguish effects of income from other influences of the family structure without precise and comprehensive measures of both for the entire childhood period. This is true for the present study as well, since we cannot entirely distinguish between possible mechanisms.

Our analysis focuses on the non-cognitive skills of children, as studies show that these skills are malleable early in life and during later life stages. Furthermore, non-cognitive skills acquired during earlier ages have an impact on skills at later ages (for instance, Carneiro et al. 2007). Further, economic literature on non-cognitive skills suggests that non-cognitive skills are associated with other outcomes, such as labor market outcomes in adulthood (Anger and Heineck 2010, Blanden et al. 2007, Carneiro et al. 2007, and Wichert and Pohlmeier 2010). This further distinguishes our study from a number of other studies that mainly focus on cognitive skills.

First, our analyses concentrate on short-term associations, as these are arguably the most important for later outcomes (see Carneiro and Heckman 2003, or Cunha and Heckman 2007). This is a new focus, since the literature on parental environment as a potential influence on child outcomes usually focuses on various school outcomes, and in doing so does not reveal what happens earlier. Second, by including adolescents in our analysis, we are able to depict how variations in a child's family environment throughout childhood are related to children's

non-cognitive skills in the long-run. Thus, correlations between changes in parental environment and early child outcomes are likely to imply long-term consequences.

We use German data for children during early childhood and for children from birth until young adulthood. We examine two samples – one comprising two birth cohorts (2002 and 2003) at the age of five or six and the other one consisting of ten birth cohorts (1983-1992) for adolescents at age seventeen[1]. We analyze data from the German Socio-Economic Panel Study (SOEP) and study our samples of preschoolers and adolescents separately in order to determine possible correlations of family instability and child outcomes at different stages. We consider maternal partnership stability by including the number of transitions in maternal partnerships and the types of partnership changes.

The remainder of the paper is structured as follows: After a summary of previous findings in Section 2, we explain our data and methods in Section 3. In Section 4 we present our results and finally conclude in Section 5.

2 Previous literature

As noted before, there are only a few studies focusing on family instability. The few studies are mainly found in sociology rather than in economics (for instance, Fomby and Cherlin 2007, Magnuson and Berger 2009, and Osborne and McLanahan 2007). Analyses in family economics mainly concentrate on specific transitions such as parental separation (Björklund and Sundstrom 2006). Thus, research in economics on child well-being and household composition views family structure to be rather static. However, the experience of maternal partnership transitions can also be regarded as dynamic process, as a "series of partnerships" (Cherlin 2009).

In a summary of research on divorce, Amato (2010) indicates that analyses on family instability are gaining in importance in the social science literature, replacing studies of family structure events. Some studies find that instability in family composition is negatively correlated with children's behavioral outcomes (Osborne and McLanahan 2007 or Amato 2003). Magnuson and Berger (2009) show that children's behavioral problems increase if they experience more

[1] The focus on these ages is due to the structure of our data. The German Socio-Economic Panel study (SOEP) surveys child development through specific mother-child questionnaires and surveys adolescent outcomes through a youth questionnaire at distinct points in time for each birth cohort. Section 3 provides a detailed description of our data.

than one transition in their family structure. Using US data from the National Longitudinal Study of Youth (NLSY), they do not just focus on instability of family environments, but they also differentiate whether a child transits into a single mother or a social father household during middle childhood. Overall, Magnuson and Berger (2009) find a negative association between family structure states (time spend in single mother household) and transitions for children's behavioral outcome rather than for achievement from age six until the age of twelve. Brown (2006) also differentiates between family structure and family transitions. She explicitly distinguishes between married partnerships and cohabiting partnerships, as the latter is perceived as less stable. Relating different family transitions to adolescents' outcomes, the author finds that the types of transitions (single to two-parent household or vice versa) do not affect delinquency at the age of fourteen differently.

Studies for the US revolving around instability show that children's cognitive test scores are negatively correlated with the number of partner changes, and also with living the first four years in a single mother household (Fomby and Cherlin 2007). Further, the externalizing behavior of white children is negatively associated with multiple changes. Using data from the Fragile Families and Child Well-being Study in the US, Fomby and Osborne (2008) argue that experiencing repeated formation and dissolution of household composition could influence children's behavioral development. Yet, it might be that the exposure to frequent conflict between parents and their partners might undermine children's development rather than the experience of disruption.

In economics few studies focus on sequential analysis of family structure states. For example, Hill et al. (2001) test existing theories in order to disentangle possible influences of changes in parental environment on children's outcomes later in life. By analyzing US data, Hill et al. (2001) find that changes are important, timing of experience matters and the influence can vary by outcomes. A study using Danish data estimates the effect of divorce and remarriage on socio-emotional behavior of children at the age of seven (Andersen et al. 2007). The authors show that experiencing a divorce early in life worsens child development in the short-run. They also find that if a separation is followed by remarriage children's behavioral problems increase compared to the one time event. Also using Danish data, Würtz-Rasmussen (2009) estimates the effect of family structure changes on children's health outcomes. She concludes that children who encounter family instability have worse health outcomes than children from stable backgrounds.

3 Data and Methods

3.1 Data

For our empirical analysis we use data from the German Socio-Economic Panel Study (SOEP). The SOEP started in 1984 and is an annual representative household panel.[2] In 2003, the SOEP introduced a series of mother-child questionnaires to survey the development of children from birth onwards. In 2008, a questionnaire focused on the development and family life of preschool children was introduced.[3] In addition to information on the early years of child development, SOEP also included youth-specific questions starting in 2000. The so-called youth questionnaire surveys adolescents who have turned seventeen and are therefore old enough to respond by themselves. Furthermore, information on non-cognitive skills, such as personality traits and on locus of control is collected.[4]

In our analyses we use data obtained from the questionnaire for mothers with preschoolers for our early childhood sample and from the youth questionnaire for our adolescence samples. We include personal and household-specific data to control for socio-economic characteristics after the birth of the child. For our analyses we restrict the samples to children who have not experienced a death of a father or mother, and, in the case of our adolescence sample, who are seventeen and for whom complete maternal partnership information from birth until the age of five/six or seventeen is available. The period t = 0 indicates the period when the child is newborn and maternal partner information can be observed as the 'initial condition' of family composition. Maternal partner changes over time are then gradually observed every year up to period t = 6, i.e. when the child is five to six years old. The preschoolers sample for t = 6 comprises 431 observations, primarily regarding the mother and the child.

For the adolescence sample we define four different observation periods: The first observation period begins at t = 0 hence at child's birth and maternal partner information can be obtained as the 'initial condition' for adolescents. Similar to maternal partner changes for early childhood we then take every year up to period t = 17, i.e. when the children answer the youth questionnaire. The sample consists of 842 observations, comprising all childhood stages and information primarily regarding the adolescents and the mother. In a second step we consider

[2] For more information about SOEP, see Wagner et al. (2007).

[3] For more information about the mother-child questionnaires in SOEP, see Schupp et al. (2008) and Siedler et al. (2009).

maternal partner transitions only from t = 0 until t = 6 in order to relate changes during early childhood to later childhood outcomes. A third stage comprises only maternal partner changes experienced during middle childhood, from t = 6 until t = 10. Our final childhood stage for adolescents defines maternal partnership changes from age ten (t = 10) until the age of seventeen (t = 17). This late childhood stage enables us to infer whether transitions experienced later in life are more strongly correlated with adolescents outcomes than those changes experienced early in life. Thus, maternal partner changes and early childhood are examined for periods t = 0 until t = 6 and transitions for adolescents are observed for periods t = 0 until t=17 as well as for early, middle and late childhood periods.

Child outcomes

Our primary measures of child outcomes are *socio-emotional behavior* for preschool children and *non-cognitive skills: locus of control* and *personality traits* for adolescents.

Within the SOEP a modified version of the Strength and Difficulties Questionnaire (SDQ), proposed by Goodman (1997), is used to collect information on the *socio-emotional behavior* (SEB) of preschool children. It measures a child's non-cognitive potential. The SDQ is part of a self-completion module, principally answered by mothers. Mothers answer 'not true', 'somewhat true' and 'certainly true' to the statements. In the SOEP, socio-emotional behavior is gathered through 17 items over five separate dimensions: Emotional Symptoms, Conduct Problems, Hyperactivity/Inattention, Peer Relationship Problems, and Prosocial Behavior. The first four dimensions are summed to a Total Difficulties Score, taking on values from 0 to 40, varying between 0 and 29 in our data with a mean of 10.7 and a standard deviation of 6 (see Figure 1a). A child can be classified into different categories of behavior: normal, borderline or abnormal depending on its score of socio-emotional behavior. Here, we construct a binary variable 'abnormal' taking on the value 1 if the Total Difficulties Score is above 17 and the value 0 if the Total Difficulties Score is between 0 and 16. The Prosocial Behavior Score ranges from 0 to 10 and indicates a positive outcome the higher a child's score. It is depicted in Figure 1b.

[Figure 1a and 1b about here]

[4] For more information about the youth questionnaire in SOEP, see Frick et al. (2010).

For adolescents we use two non-cognitive skill measures, namely *locus of control* (Rotter 1966) and *personality traits* (McCrae and Costa 1996, 1999), described by a Five Factor model. The SOEP measures *locus of control* on the youth questionnaire using a ten-item instrument. Adolescents rate each item on a scale from 1 (completely disagree) to 7 (completely agree). Using a factor analysis approach enables us to determine whether adolescents believe that their life depends on their own action (internal locus of control) or whether they believe that their life is determined by others or by fate (external locus of control). We examine the correlation between adolescents' external locus of control and maternal partner changes, as we argue that children who experience instability in their family composition might more likely believe that life is determined by fate. Some studies show that believing in fate (having an external locus of control) is associated with negative outcomes at later stages, for instance negative labor market outcomes (Anger and Heineck 2010 or Caliendo et al. 2010). For example, Caliendo et al. (2010) find that individuals who have an external locus of control are less likely to leave unemployment. In our adolescent sample, 731 adolescents provide information on their locus of control (see Figure 2a and 2b).

The *personality traits* are surveyed with a sixteen-item instrument and are based on the Five Factor Model by McCrae and Costa (1996 and 1999). In order to examine potential associations between changes in maternal partnerships and children's personality, we extract five factors using a factor analysis: Openness, Conscientiousness, Extraversion, Agreeableness and Neuroticism. Children experiencing multiple transitions in their environment might be more likely characterized as less conscientious or less open than children from stable families. A study analyzing personality traits and female labor force participation finds that conscientious women are more likely to participate in the labor force in general (Wichert and Pohlmeier 2010). In the SOEP, personality traits are only available starting with the 2006 wave, hence we observe personality traits for 328 adolescents in our sample.

[Figure 2a and 2b about here]

Family instability

With respect to the independent variables, our key explanatory factors are those describing maternal partnership stability. We focus on the number of transitions by implicitly accounting for the types of changes experienced. Because mothers are still the main caregivers of children in most cases, we are more likely to obtain information for biological mothers than fathers in

our data set. We, thus, rely on maternal information regarding household structure. In terms of the father we assume that the male household member observed at time of birth of the child is the biological father. Any other observed male household member surveyed in a child's family at a later period is either a social father or a new life partner of the child's mother. We define a change in partners – be it either a different partner (two parent to two parent household), a new partner (lone parent to two parent household) or no partner (two parent to single parent household) – of a child's mother from one year to the next to be a partner change. It can occur due to separation without divorce, separation with divorce, new partners moving in, being newly married or cohabiting. Thus a family structure change is any relationship change of the mother that a child experiences. Since we use yearly information, we cannot account for changes occurring between our observations, but we argue that additional transitions occurring during the year are rare. We do not distinguish between married or cohabiting families. We compare these children to children whose mothers live in stable relationships over the entire observation period. These stable relationships include single parenthood. For our sample of adolescents we differentiate four periods of a stable single parenthood: First we define a stable single mother household for the period from birth until seventeen. Second, we shorten this period by using age six as an end point. A third period begins at age six and ends at age ten and a fourth period for our late childhood sample is ten through age seventeen. From the obtained partner changes we construct dummy variables as well as an ordinal measure comprising the number of transitions experienced. We observe a maximum of three changes in the household composition for children aged five or six during the entire observation period. For children aged seventeen we identify up to five changes in maternal partnerships for the complete childhood period. Transitions are coded into two dummy variables depicting one change or multiple changes (two or more changes). In order to analyze all possible correlations of maternal partner changes with non-cognitive outcomes of children, we examine the number of changes and types of changes separately. Table 1 gives a descriptive overview on the distribution of the types and number of changes experienced by preschoolers. In Table 2 we depict the distribution of family (in)stability for the complete childhood of adolescents, as well as for different childhood stages.

[Table 1 and 2 about here]

3.2 Methods

Let S_{jia} measure non-cognitive skill outcome j of child i at age a. The main objective is to identify the parameter β_{ia} in the following linear model of child outcome:

$$S_{jia} = \beta_{ia} Ch_{ia} + \gamma_{ia} X_{ia} + \eta_{ija} \quad (1)$$

We use ordinary least squares (OLS), which controls for child, mother and family and household characteristics (X_i), to measure the "effect"[5] of experiencing transitions in maternal partnership. If $j=1$ of S_{jia} it captures the Total Difficulties Score of each child i at age five to six and if $j=2$ locus of control of each child i at age seventeen or $j=3$ personality traits of child i at age seventeen. Ch_{ia} represents changes in maternal partnerships; either number of transitions or types and η_{ija} is an error term.

As described in Section 3, the socio-emotional behavior of children comprises not just the Total Difficulties score but also a score of prosocial behavior. Additionally, the Total Difficulties score can be classified into three categories 'normal', 'borderline' and 'abnormal'. We estimate Equation 1 by ordinary least squares when examining the *total score of prosocial behavior*. When the outcome of interest is *abnormal behavior*, we analyze a binary logit model, since 'abnormal' is a dummy variable taking on the value of 1 if the child is classified 'abnormal', and the value 0 if the child fits into the categories 'normal' or 'borderline'.

The parameter of interest is the estimated change coefficient β_{ia} that captures the incremental increase in a child's socio-behavioral outcome from having experienced a maternal partner change relative to those children who live in stable families. Estimating Equation 1 will yield unbiased estimates of β_{ia}, given that there is no correlation of child i's outcome with changes in the household composition.

Yet, one potential problem for our analysis of changes in parental environment might be reverse causality. A maternal partner change might not just be correlated with difficult socio-emotional behavior of the child, but might also result from having an 'abnormal' child. Put in a formal way: If the error term η_{ija} comprises 'parental stress originating from difficult child' and is correlated with Ch_{ia}, the estimate of β_{ia} will be biased. Our explanatory variable does not allow us to address the problem of reverse causality, since our outcome variables are only

[5] If we use the term "effect" in this paper with respect to our analysis, this is not correct in the strict sense, as we do not claim to find causal relationships. However, for the reason of simplicity we use this term in the following without quotation marks.

measured at one point in time: We do not have any non-cognitive outcome measures from the time before maternal partner changes take place. Moreover, there is no plausible instrument that could be implemented in our sample of early childhood. Yet, we argue, in the case of maternal partner changes in the first years, that the empirical incidence for developmental problems of the child causing a 'partner change' is assumed to be very small if not non-existing. Even more so, since our child outcome measure, the socio-emotional behavior of the child is not a measure for a clinically severe problem. In the case of the non-cognitive skills of our adolescent sample, the same argument applies. The latter argument might be even stronger, as the skills we observe are, *per se*, neither negative nor positive. Thus, we assume that it is a rather scarce or non-existent event that causes partners to separate due to the personality of their child.

Furthermore, other sources of unobserved heterogeneity might pose problems for our analysis. There might be hidden factors influencing family stability and child outcomes at the same time. One such factor could be mothers' personality. Thus, our sensitivity analysis controls for maternal personality traits in both, our preschool sample and our adolescents' sample. By including mother's personality characteristics as covariates, we check if mother's who switch partners might be different in their personality and therefore affect child outcomes or if despite mother's characteristics partnership transitions are correlated with children's outcomes. Accounting for additional maternal characteristics allows us to control for potential self-selection of partnership transitions and unobserved heterogeneity.

Moreover, the literature often suggests assessing unobserved heterogeneity by using sibling fixed effects. Thus we pursue another sensitivity analysis using this particular method. In our early childhood sample we are unable to apply a sibling fixed effects approach due to our small sample size. However, for our analysis of maternal partner changes and non-cognitive outcomes of adolescents we are able to create sub samples clustering on families. If one considers data on child *i* in family *j*, we are able to cluster adolescents into families by defining siblings to be a family if they have the same mother and the same father identifier. Equation 2 depicts our cluster-specific model, here *family-specific*:

$$S_{ji} = \beta_{ij} Ch_{ij} + \gamma_{ij} X_{ij} + \delta_i + \eta_{ij} \tag{2}$$

The model controls for all time invariant factors whether they are observed or not. δ_i of Equation 2 represents child and family characteristics that are fixed over time – here, invariant across siblings. Hence, as depicted by Equation 3, we take the difference of Equation 2 between

siblings estimating our model within families across siblings and Ch_{ij} remains if it is varying over siblings, whereas δ_i – time invariant factors – is dropped.

(3) $$S_{j1} - S_{j2} = \beta(Ch_{j1} - Ch_{j2}) + \gamma(X_{j1} - X_{j2}) + (\eta_{j1} - \eta_{j2})$$

4 Results

First, we report potential effects of changes in maternal partnerships on socio-behavioral outcomes of preschoolers. In a second step, we discuss how maternal partner transitions are associated with adolescents' non-cognitive skills. In all our tables we only present the estimates for the variables of interest: family instability. Appendix B presents two tables where all variables that are included in our analyses are presented.[6]

4.1 Family instability and the socio-emotional behavior of preschool children

For our analysis with regards to changes in maternal partnerships, we present two models, all of which contain age of mother, years of education (mother), household income near the time of birth, child's age in months, gender of the child, hours spent in formal care, younger sibling present and older sibling present as control variables. The model includes number of family structure changes and types of changes experienced. In a second model specification we control for stable single parent households rather than including it in our baseline category – this allows us to test the social control theory in particular (see chapter 1).

Preschool children, who experience multiple changes, hence two or three maternal partnership transitions, have a higher Total Difficulties Score than children who experience no change in their family structure. Table 3 shows that the number of family transitions is positively correlated with the socio-emotional behavior of preschoolers. Hence, the more transitions a child experiences, the higher their socio-emotional problems: One more partner change increases the SDQ score by 1.1, whereas an extra year in mother's education reduces a child's socio-emotional behavior score by 0.21. The probability of being abnormal is only positively correlated with experiencing one change. The prosocial behavior of children is also negatively associated with one maternal partnership transition if we distinguish whether this one change is

[6] The other models with all covariates are available by the authors upon request.

a transition from a single to a two-parent household or from a two-parent to a lone parent household. In particular the transition to a lone parent household increases the probability of abnormal behavior.

[Table 3 about here]

If we modify our baseline to include stable single parent households ("never partnered") as dummy in our model, the potential associations of multiple maternal partner changes with children's socio-emotional behavior increases. Table 3a also indicates that living in a stable single parent household does not significantly change children's outcome compared to children who live in stable two-parent households. Here, we find that the experience of multiple partnership transitions increases the socio-emotional behavior score by 2.68 compared to a reduction of the SDQ score by 1.59 points for girls who experience no change.[7]

[Table 3a about here]

4.2 Family instability and non-cognitive skills of adolescents

Maternal partnership transitions and adolescents' outcomes are assessed in different models accounting for transitions during different periods in life. All estimations contain age of mother, years of education (mother), log of household income, adolescent gender, enrolled school track (upper school track being the reference category), region (East Germany vs. West Germany), birth order, and migration background as control variables. First we present a model in which we examine how changes in maternal partnership from birth until the age of seventeen are associated with adolescents' non-cognitive skills – either locus of control or personality traits. In a second step, we differentiate maternal partner changes experienced by adolescents during childhood stages – hence between birth and the age of six, between age six and age ten, and between age ten and age seventeen. These models allow us to assess whether long-term correlations between number of family structure transitions and child outcomes exist, as already examined in the short-term association for our preschool sample. In all of our tables we again present the estimates of the various variables on maternal partnership transitions alone.

[7] These gender specific results are not presented in this paper, but are available by the authors upon request.

4.2.1 Locus of control

Table 4 shows that adolescents who experience more transitions from birth until the age of seventeen are more likely to believe that their life is determined by fate or others. If a child experiences one more transition from birth until age seventeen, he or she has a higher external locus of control by $1/10^{th}$ of a standard deviation. In comparison, an extra year of mothers' education leads to a lower external locus of control by nearly $1/25^{th}$ of a standard deviation. If we differentiate whether one or multiple changes are correlated with the external locus of control factor, we see that multiple partnership transitions increase the coefficient of adolescents' belief in an external determination of life – more then just one transition (see Panel B). Children's belief in self-determination is negatively associated with their experience of one change in maternal partnership – either a separation or a new partner – during their life. In a final step we differentiate whether a one-time transition is a change from single to two-parent or from two-parent to single parent household in order to see what type of change is correlated with the internal locus of control factor. In Panel C of Table 4 this distinction is presented and we see that a partner change ("new partner") is negatively correlated with adolescents' belief in self-determination. If we examine all relations for girls and boys separately, we find no significant correlations for girls (Table 4a). For male adolescents, on the other hand, significant associations between multiple partnership transitions and their external locus of control factors exist. These analyses do not distinguish at what stage during childhood transitions occur.

[Table 4 and 4a about here]

In Table 5 we depict the association of maternal partnership transitions distinguished by childhood stages. This allows us to show if being exposed to maternal partnership transitions during early childhood might have long-term consequences, as non-cognitive skills are measured at age seventeen. Panel A shows that transitions occurring between birth and the age of six are significantly correlated with adolescents' locus of control. One more partnership transition experienced from birth until the age of six decreases adolescents' internal locus of control by $1/11^{th}$ of a standard deviation, while an extra year in mothers' education renders a lower internal locus of control by $1/25^{th}$ of a standard deviation. Further, Panel B of Table 5 shows that multiple transitions during early childhood are positively correlated with the external locus of control factor, and one transition experienced before the age of six significantly decreases adolescents' internal locus of control. If, in a last specification, we differentiate one transition to be either a new partner or a separation, we find that a new partner

moving into the household during early childhood decreases adolescents' belief in self-determination. If we examine girls and boys separately, we find a negative significant relationship for girls who experience late childhood transitions on their internal locus of control. For boys, on the other hand, we see that the number of transitions from birth until the age of six is correlated with their external locus of control factor – they are more likely to believe that their life depends on fate or others[8]. Thus locus of control is correlated with family instability at different childhood stages for boys and girls.

[Table 5 about here]

4.2.2 Personality traits

Table 6 shows how adolescent personality traits are associated with maternal partnership instability if this instability is experienced throughout their entire childhood, until they turn seventeen. We find that the number of transitions (Panel A) is negatively correlated with children's characteristic to be agreeable, i.e. to be considerate or kind to others. For the different types of transitions (Panel B) – one transition or multiple transitions – we see that the former is negatively associated with the factor conscientiousness (e.g., to do things effectively and efficiently) and the latter is negatively correlated with the factor agreeableness. If we further differentiate one transition (Panel C), we find that the factor conscientiousness is negatively correlated with a change from a single parent to a two-parent household. Separately analyzing girls and boys finds that conscientiousness is negatively correlated with the number of transitions for boys; whereas for girls agreeableness is associated with maternal partnership changes – however, due to the small sample sizes of gender specific samples these results should be interpreted carefully (Tables available upon request).

[Table 6 about here]

For adolescents who experience family instability at various stages during childhood, we again find that the number of transitions experienced during early childhood is negatively correlated with conscientiousness and agreeableness (Table 7). If an adolescent experiences one additional transition in maternal partnerships it reduces his agreeableness by $1/5^{th}$ of a standard deviation, compared to a greater agreeableness by $1/4^{th}$ of a standard deviation if logarithmic household

[8] These gender specific results are not presented in this paper, but are available by the authors upon request.

income increases by one unit. Types of transitions are similarly associated with personality traits as found for the entire childhood in Table 6. One transition during early childhood is negatively correlated with conscientiousness. Multiple transitions occurring before the age of six reduce adolescents' agreeableness, but multiple transitions between the age of ten and seventeen increase children's conscientiousness (Table available upon request). Further, specifying the type of one transition shows that a new partner moving in during early childhood is negatively correlated with conscientiousness. If a change from single to two-parent household or from two-parent to different two-parent household occurs during middle childhood it decreases the factor of extraversion, whereas the same transition during late childhood reduces adolescents' agreeableness (Table available upon request). When analyzing these relationships for girls and boys separately, we find that agreeableness decreases significantly for girls and conscientiousness on the other hand is negatively related with maternal partnership instability for boys (Tables available upon request).

[Table 7 about here]

4.3 Sensitivity Analysis

To reduce the problem of unobserved heterogeneity, we perform two sensitivity analyses. First we examine if children's non-cognitive skills are affected by maternal partnership instability or if we measure potential effects of mothers' personality. We might be capturing changes in children's behavior simply because mothers who are in sequential partnerships are more likely to have an outgoing personality, which might also be associated with their children's socio-emotional behavior or children's beliefs in life. To measure the mother's personality, we use the same scale as for the children. Descriptive analyses show that the number of transitions of maternal partnerships is not correlated with maternal personality traits in our preschool sample. Yet, mothers who relate to extraversion and relate less to agreeableness are more likely to change their partner in our adolescence sample. Hence, our results might capture the influence of mothers' personality, namely extraversion, on adolescents' locus of control. But if we analyze our previous models (see Section 4.1 and 4.2) by controlling for maternal personality traits, our results remain rather unchanged (Tables available upon request). Therefore we argue that we depict associations between maternal partnership instability and their children's outcomes and not between maternal characteristics by which mothers' self-select into sequential partnerships.

Yet, this method does not completely capture unobserved heterogeneity. So fixed effect models are estimated. A fixed effects approach requires panel data, or the possibility to cluster data into groups, that allow assessing differences either across time or across siblings for instance. Our two samples are pooled cross-sections and we observe each child once at the specific ages – either at five/six or at seventeen. Yet, siblings can be identified in our adolescents' sample, which enables us to cluster adolescents into families. We consider adolescents to be members of a family if they possess the same mother and the same father identifier in our sample. Both identifiers contain the earliest possible information about mothers and fathers in the SOEP. By clustering adolescents in families, we generate a sample of 395 siblings across 183 families. We compare the potential impact of maternal partnership instability within families, namely across siblings, by applying random and fixed effects clustering on the family-level and controlling for sibling-variant characteristics such as age of mother, attended school track, gender, birth order, and our main explanatory variable, the number of transitions experienced. The standard Hausman test suggests that the fixed effects model applies, i.e. that unobserved characteristics α_i correlate with our covariates. We find that multiple transitions experienced from birth until age seventeen remain positively correlated with adolescents' belief that life depends on fate. In our fixed effects model this suggests that siblings who experience more maternal partnership transitions have a higher external locus of control (Table 8).

[Table 8 about here]

5 Conclusions

Our paper focuses on family instability rather than assessing family structure by taking the perspective of the mother when children are preschoolers and teenagers. We target non-cognitive skills as outcome measures, as these skills are developed during childhood and determine outcomes later in life, such as labor market outcomes (see Anger and Heineck 2010, Caliendo et al. 2010, or Carneiro et al. 2007). We distinguish between instabilities during different childhood stages. Our analysis is based on German data. In all these aspects our research can be considered as an extension to existing research.

Our results show that family instability is associated with weaker behavioral outcomes for preschool children as well as with "weaker" outcomes for adolescents. The latter is true if the degree of "weakness" is measured in terms of skills, which are correlated, for instance, with better labor market outcomes. Early childhood experiences of maternal partnership transitions

determine not just short-term outcomes, but also non-cognitive skills at the age of seventeen. Thus, not only early child outcomes are influenced by family environments, as recent literature suggests (Cunha and Heckman 2008, 2009), but also early childhood occurrences matter for children's skill formation throughout the course of life. They matter more than instabilities during later childhood stages. Thus, these results once more demonstrate the importance of the early years.

When examining early childhood outcomes and their potential association with maternal partner changes, we find that multiple transitions are significantly more correlated with preschoolers' socio-emotional behavior than single transitions. Stable environments, with respect to family structure, seem to be best for this child outcome. These results are consistent with studies for other countries (see for instance Andersen et al. 2007). There are some hints that the transition from two parents to single parent seems to affect the socio-emotional behavior in a more severe manner than the transition from a two-parent to a different two-parent household or from a lone parent to two-parent household. If this is verified by other studies, it would not comply with social control theory.

Further, we find that non-cognitive skills of adolescents are negatively associated with the number of family structure transitions experienced. Adolescents' perceived belief of whether life depends on others or if one determines their own life is correlated with maternal partner changes throughout childhood. Here we find that early childhood occurrences of family instability persist. Non-cognitive skills measured at the age of seventeen are affected by maternal partnership transitions during early childhood. This relationship is particular true for boys. Transitions that happen in later childhood periods are less strongly correlated with outcomes in adolescence. Thus, experiencing family instability early in life is likely to alter adolescents' belief that life depends on fate. We perform several sensitivity analyses that support our findings. Adolescents, whose siblings experience fewer maternal partnership transitions, are less likely to have an external locus of control.

In reference to developmental psychology, our results indicate that disrupting family bonds is 'harmful' in early years. Loosing an attachment figure once or twice early in life is likely to result in a setback for children's development. The attachment theory proposed by Bowlby (1969) indicates that the relationship between a child and his or her primary caregiver affects

later socio-emotional behavior. Studies in developmental psychology also show that a larger number of family transitions are associated with worse emotional adjustments for boys (see Capaldi and Patterson, 1991, or Martinez and Forgatch, 2002). In line with these findings we argue that it is necessary to examine family instability, namely multiple maternal partnership transitions, rather than analyzing just the family structure. More than single transitions – whether divorce/separation or a new partner moving into the household – it seems that multiple events are more 'harmful' for child development early on in life. Hence, although theories like economic hardship theory or social control theory are related to family transitions – especially for one-time changes – and explain its influence on child development, we find some evidence that the theory of stress is strongly linked to non-cognitive skill formation of preschoolers and adolescents. Nevertheless, the underlying mechanisms are not the focus of this study. Further research is needed to disentangle these mechanisms. Another shortcoming of our analysis is that we cannot be certain that we show a clear causal relationship between our child outcomes and maternal partnership transitions, although we discuss several sensitivity tests to reduce potential biases of unobserved heterogeneity.

From a policy perspective, we argue that children who experience maternal partnership transitions should have their non-cognitive skills addressed in order to reduce the long-run negative effects. Institutions, other than the family, could assist children who lack support at home. Here day care and schools could play an important role in helping children's non-cognitive skill formation. Teachers who know about children's family situation can interact with these children and could help them to cope with stress and instability due to changes in maternal partnerships (see Potter 2010).

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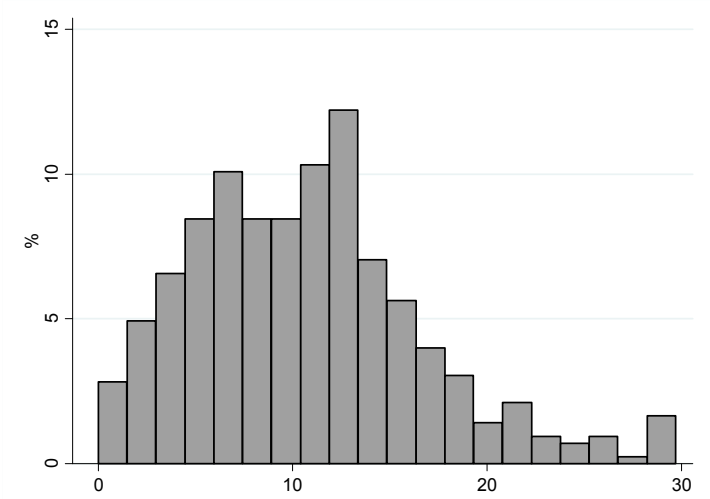
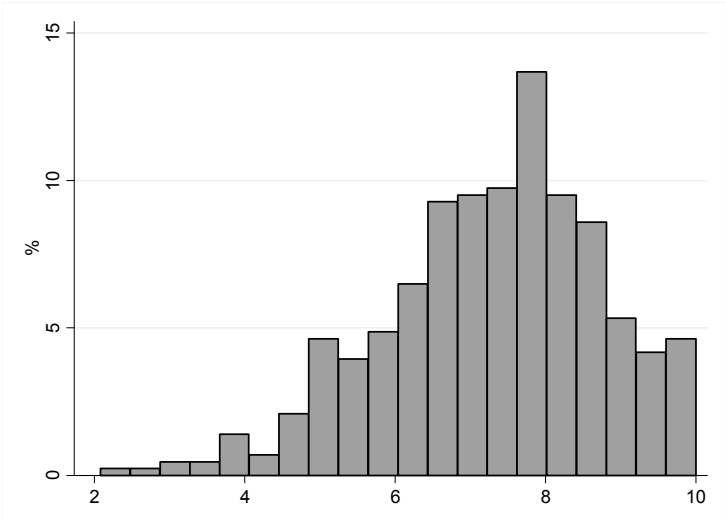
Figures and Tables

Figure 1a. Distribution of the Total Difficulties Score



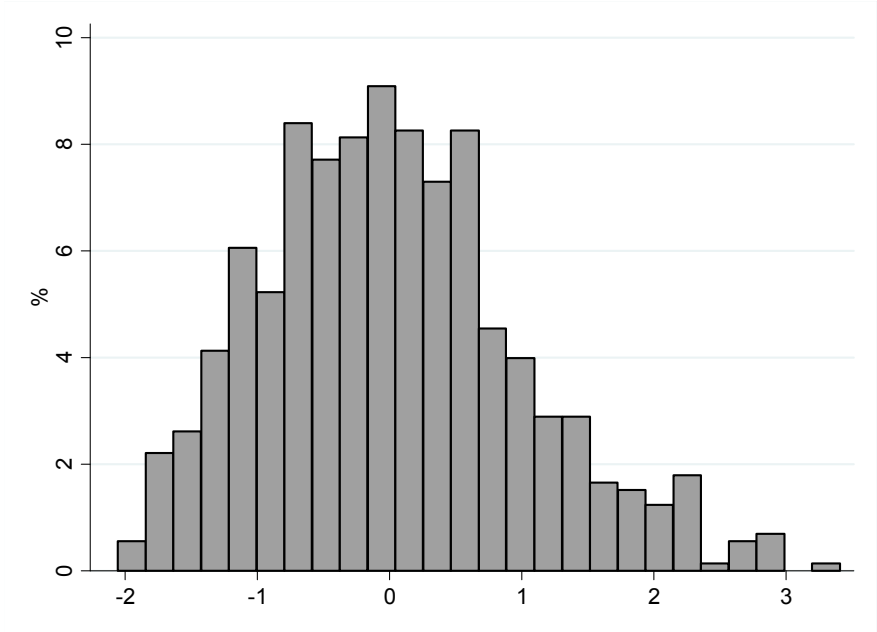
Note: Data from the SOEP v26, (2008-2009), own calculations, N = 426.

Figure 1b. Distribution of the Prosocial Behavior Score



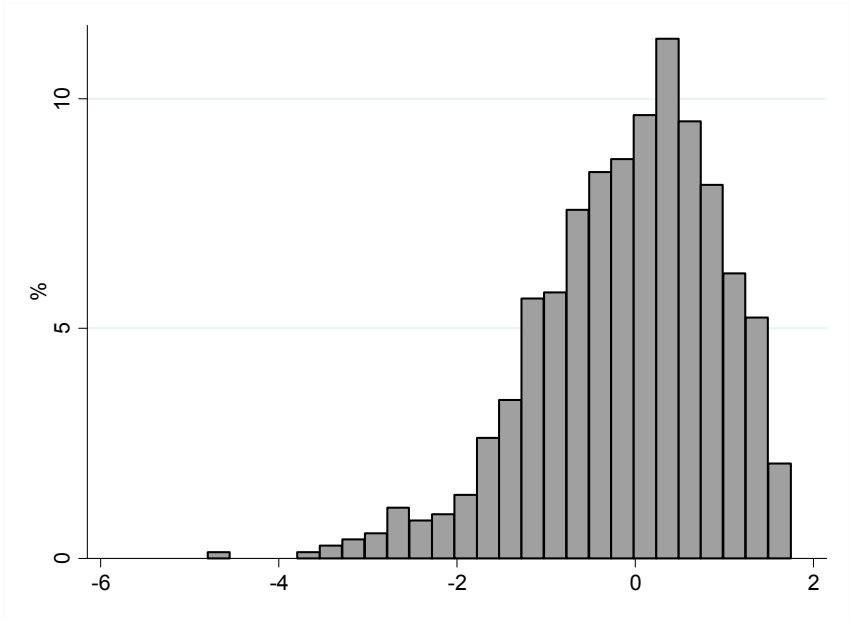
Note: Data from the SOEP v26, (2008-2009), own calculations, N = 431.

Figure 2a. Distribution of the External Locus of Control Factor



Note: Data from the SOEP v26, (2001-2009), own calculations, N = 726.

Figure 2b. Distribution of the Internal Locus of Control Factor



Note: Data from the SOEP v26, (2001-2009), own calculations, N = 726

Table 1: Descriptive statistics of maternal partner changes (preschool children)

	Mean	Std. dev.	N
Number of changes (min=0, max=3)	0.20	0.55	431
One change	0.11	0.32	431
New partner (single parent to two parent)	0.04	0.20	431
Separation (two parent to single parent)	0.07	0.26	431
Multiple changes	0.04	0.19	431
No changes	0.85	0.36	431

Note: Data from the SOEP v26, (2008-2009), pooled data, own calculation.

Table 2: Descriptive statistics of maternal partner changes (adolescents)

	Mean	Std. dev.	N
Complete childhood			
Number of changes (min=0, max=5)	0.42	0.86	842
One change	0.12	0.33	842
New partner (single parent to two parent)	0.04	0.19	842
Separation (two parent to single parent)	0.08	0.27	842
Multiple changes	0.12	0.32	842
No changes	0.76	0.43	842
Early childhood			
Number of changes (min=0, max=3)	0.17	0.48	842
One change	0.09	0.29	842
New partner (single parent to two parent)	0.05	0.22	842
Separation (two parent to single parent)	0.04	0.20	842
Multiple changes	0.04	0.19	842
No changes	0.87	0.33	842
Middle childhood			
Number of changes (min=0, max=3)	0.09	0.36	842
One change	0.06	0.23	842
New partner (single parent to two parent)	0.02	0.12	842
Separation (two parent to single parent)	0.04	0.19	842
Multiple changes	0.02	0.13	842
No changes	0.93	0.26	842
Late childhood			
Number of changes (min=0, max=3)	0.15	0.44	842
One change	0.09	0.29	842
New partner (single parent to two parent)	0.03	0.17	842
Separation (two parent to single parent)	0.06	0.25	842
Multiple changes	0.02	0.15	842
No changes	0.88	0.33	842

Note: Data from the SOEP v26, (2000-2009), pooled data, own calculation.

Table 3: Estimation of socio-emotional behavior and maternal partner changes (preschool children)

	Socio-emotional behavior	Prosocial behavior	Abnormal behavior: marg. eff.
Panel A:			
Number of transitions	1.105*	-0.176	0.051+
	[0.5084]	[0.1496]	[0.0276]
N	421	426	410
R^2	0.080	0.044	
pseudo R^2			0.030
Panel B:			
Baseline: No transition			
One transition	1.088	-0.379	0.148*
	[1.0365]	[0.2506]	[0.0717]
Multiple transitions	2.566+	-0.099	0.072
	[1.3456]	[0.4441]	[0.1141]
N	421	426	410
R^2	0.079	0.046	
pseudo R^2			0.037
Panel C:			
Baseline: No transition			
One transition (New partner)	-0.460	-0.565+	-0.027
	[1.2839]	[0.3340]	[0.0773]
One transition (Separation)	2.066	-0.263	0.278**
	[1.3958]	[0.3307]	[0.1044]
Multiple transitions	2.651+	-0.089	0.084
	[1.3513]	[0.4441]	[0.1179]
N	421	426	410
R^2	0.083	0.047	
pseudo R^2			0.051

Robust standard errors in second row, + p < 0.10, * p < 0.05, ** p < 0.01. Note: We control for age of mother, years of education (mother), log of household income near birth, age of child (months), gender, hrs spent in childcare, younger siblings present, and older siblings present. Own calculations: SOEP v26, (2008-2009).

Table 3a: Estimation of socio-emotional behavior and maternal partner changes (preschool children)

	Socio-emotional behavior	Prosocial behavior	Abnormal behavior: marg. eff.
Panel A: *Baseline: No transition and partnered*			
One transition	1.235	-0.419^{+}	0.160*
	[1.0453]	[0.2527]	[0.0739]
Multiple transitions	2.679*	-0.129	0.080
	[1.3536]	[0.4461]	[0.1171]
Never partnered	1.590	-0.431	0.098
	[1.3021]	[0.3509]	[0.1328]
N	421	426	410
R^2	0.081	0.049	
pseudo R^2			0.039
Panel B: *Baseline: No transition and partnered*			
One transition (New partner)	-0.357	-0.590^{+}	-0.022
	[1.2831]	[0.3336]	[0.0796]
One transition (Separation)	2.257	-0.309	0.298**
	[1.4058]	[0.3335]	[0.1066]
Multiple transitions	2.775*	-0.119	0.093
	[1.3594]	[0.4462]	[0.1214]
Never partnered	1.693	-0.420	0.114
	[1.3148]	[0.3508]	[0.1381]
N	421	426	410
R^2	0.086	0.050	
pseudo R^2			0.054

Robust standard errors in second row, + p < 0.10, * p < 0.05, ** p < 0.01. Note: We control for age of mother, years of education (mother), log of household income near birth, age of child (months), gender, hrs spent in childcare, younger siblings present, and older siblings present. Own calculations: SOEP v26, (2008-2009).

Table 4: Estimation of locus of control and maternal partner changes for complete childhood (adolescents)

	External locus of control	Internal locus of control
Panel A:		
Number of transitions	0.097* [0.0486]	-0.090+ [0.0461]
N	682	682
R^2	0.077	0.044
Panel B:		
Baseline: No transitions		
One transition	0.135 [0.1101]	-0.365** [0.1228]
Multiple transitions	0.278* [0.1342]	-0.135 [0.1223]
N	682	682
R^2	0.078	0.052
Panel C:		
Baseline: No transitions		
One transition (New partner)	0.110 [0.1714]	-0.636** [0.2450]
One transition (Separation)	0.102 [0.1419]	-0.221 [0.1419]
Multiple transitions	0.270* [0.1339]	-0.129 [0.1223]
N	682	682
R^2	0.077	0.054

Robust standard errors in second row, + p < 0.10, * p < 0.05, ** p < 0.01. Note: We control for age of mother, years of education (mother), log of household income, gender, attended school track, region (East), birth order, and migration background. Own calculations: SOEP v26, (2001-2009).

Table 4a: Estimation of locus of control and maternal partner changes for complete childhood (adolescents)

	External locus of control (Boys)	External locus of control (Girls)
Panel A:		
Number of transitions	0.144* [0.0679]	0.038 [0.0696]
N	336	346
R^2	0.153	0.044
Panel B:		
Baseline: No transition		
One transition	0.037 [0.1502]	0.210 [0.1554]
Multiple transitions	0.433* [0.1861]	0.075 [0.1898]
N	336	346
R^2	0.156	0.048
Panel C:		
Baseline: No transition		
One transition (New partner)	-0.012 [0.2534]	0.195 [0.2625]
One transition (Separation)	0.096 [0.1963]	0.098 [0.1901]
Multiple transitions	0.435* [0.1856]	0.059 [0.1899]
N	336	346
R^2	0.157	0.045

Robust standard errors in second row, + p < 0.10, * p < 0.05, ** p < 0.01. Note: We control for age of mother, years of education (mother), log of household income, gender, attended school track, region (East), birth order, and migration background. Own calculations: SOEP v26, (2001-2009).

Table 5: Estimation of locus of control and maternal partner changes by childhood stages (adolescents)

	External locus of control	Internal locus of control
Panel A:		
Number of transitions *(early childhood)*	0.100 [0.0809]	-0.173+ [0.0925]
Number of transitions *(middle childhood)*	0.020 [0.1222]	-0.016 [0.0939]
Number of transitions *(late childhood)*	0.149 [0.0938]	-0.057 [0.0907]
N	682	682
R^2	0.078	0.046
Panel B:		
Baseline: No transition		
One transition *(early childhood)*	-0.027 [0.1430]	-0.404* [0.1591]
Multiple transitions *(early childhood)*	0.389+ [0.2009]	-0.099 [0.2151]
One transition *(middle childhood)*	0.147 [0.1558]	-0.123 [0.2041]
Multiple transitions *(middle childhood)*	-0.059 [0.3691]	0.213 [0.1747]
One transition *(late childhood)*	0.162 [0.1403]	-0.135 [0.1246]
Multiple transitions *(late childhood)*	0.316 [0.2501]	0.063 [0.3153]
N	682	682
R^2	0.082	0.056
Panel C:		
Baseline: No transition		
One transition – New partner *(early childhood)*	0.068 [0.1802]	-0.632** [0.2218]
One transition – Separation *(early childhood)*	-0.207 [0.2506]	-0.244 [0.2021]
Multiple transitions *(early childhood)*	0.398+ [0.2030]	-0.110 [0.2126]
One transition – New partner *(middle childhood)*	0.161 [0.3829]	0.122 [0.4099]
One transition – Separation *(middle childhood)*	0.169 [0.1998]	-0.194 [0.2761]
Multiple transitions *(middle childhood)*	0.005 [0.3834]	0.173 [0.1867]
One transition – New partner *(late childhood)*	-0.004 [0.2250]	-0.148 [0.2589]
One transition – Separation *(late childhood)*	0.188 [0.1630]	-0.081 [0.1509]
Multiple transitions *(late childhood)*	0.341 [0.2476]	0.040 [0.3093]
N	682	682
R^2	0.083	0.061

Robust standard errors in second row, + p < 0.10, * p < 0.05, ** p < 0.01. Note: We control for age of mother, years of education (mother), log of household income, gender, attended school track, region (East), birth order and migration background. Own calculations: SOEP v26, (2001-2009).

Table 6: Estimation of personality traits and maternal partner changes for complete childhood (adolescents)

	Openness	Conscientious.	Extraversion	Agreeableness	Neuroticism
Panel A:					
Number of transitions	-0.029 [0.0567]	-0.098 [0.0727]	-0.027 [0.0687]	-0.122+ [0.06910	0.037 [0.0594]
N	328	328	328	328	328
R^2	0.085	0.082	0.033	0.070	0.072
Panel B:					
Baseline: No transition					
One transition	-0.246 [0.166]	-0.432* [0.1716]	0.137 [0.1743]	-0.078 [0.1942]	-0.252 [0.1682]
Multiple transitions	-0.003 [0.1568]	-0.250 [0.1947]	-0.250 [0.1947]	-0.355+ [0.1951	0.161 [0.1756]
N	328	328	328	328	328
R^2	0.092	0.100	0.042	0.070	0.082
Panel C:					
Baseline: No transition					
One transition (New partner)	-0.418 [0.2981]	-0.729** [0.2144]	-0.118 [0.2866]	-0.114 [0.3554]	-0.502 [0.3403]
One transition (Separation)	-0.144 [0.1984]	-0.266 [0.2399]	0.311 [0.2082]	0.037 [0.2173]	-0.222 [0.1890]
Multiple transitions	-0.002 [0.1573]	-0.248 [0.1953]	-0.256 [0.1814]	-0.347+ [0.1962]	0.152 [0.1759]
N	328	328	328	328	328
R^2	0.093	0.103	0.047	0.069	0.087

Robust standard errors in second row, + p < 0.10, * p < 0.05, ** p < 0.01. Note: We control for age of mother, years of education (mother), log of household income, gender, attended school track, region (East), birth order, and migration background. Own calculations: SOEP v26, (2001-2009).

Table 7: Estimation of personality traits and maternal partner changes by childhood stages (adolescents)

	Openness	Conscientious.	Extraversion	Agreeableness	Neuroticism
Number of transitions *(early childhood)*	-0.138 [0.0997]	-0.228+ [0.1177]	-0.196+ [0.1168]	-0.206+ [0.1205]	0.039 [0.1184]
Number of transitions *(middle childhood)*	0.037 [0.1175]	-0.168 [0.1410]	0.078 [0.1670]	0.001 [0.1399]	0.165 [0.1689]
Number of transitions *(late childhood)*	0.070 [0.1500]	0.138 [0.1476]	0.125 [0.1412]	-0.100 [0.2001]	-0.067 [0.1308]
N	328	328	328	328	328
R^2	0.090	0.094	0.043	0.073	0.075

Robust standard errors in second row, + p < 0.10, * p < 0.05, ** p < 0.01. Note: We control for age of mother, years of education (mother), log of household income, gender, attended school track, region (East), birth order, and migration background. Own calculations: SOEP v26, (2001-2009).

Table 8: Estimation of locus of control and maternal partner changes using fixed effects for complete childhood (adolescents – siblings sample)

	External locus of control	Internal locus of control
Panel A:		
Number of transitions	0.348 [0.355]	-0.092 [0.467]
N	343	343
R^2	0.041	0.144
Panel B:		
Baseline: No transitions		
One transition	-0.133 [0.401]	-0.444 [0.471]
Multiple transitions	1.105+ [0.595]	0.116 [1.040]
N	343	343
R^2	0.063	0.152
Panel C:		
Baseline: No transitions		
One transition (New partner)	-0.500 [0.438]	-0.868* [0.433]
One transition (Separation)	0.323 [0.399]	0.082 [0.497]
Multiple transitions	0.926+ [0.489]	-0.091 [0.946]
N	343	343
R^2	0.073	0.162

Robust standard errors in second row, + p < 0.10, * p < 0.05, ** p < 0.01. Note: We control for age of mother, gender, attended school track, and birth order. Own calculations: SOEP v26, (2001-2009).

Appendix A

Table A1: Descriptive statistics of variables by family stability

	No transition		Transitions	
Variables	Mean	Std. dev.	Mean	Std. dev.
Preschool sample				
Socio-emotional behavior	10.44	5.79	12.27	6.47
Prosocial behavior	7.37	1.52	7.29	1.63
Normal	0.72	0.45	0.63	0.49
Borderline	0.15	0.36	0.12	0.33
Abnormal	0.13	0.34	0.25	0.43
Age in months	69.62	4.12	69.64	3.92
Female	0.48	0.50	0.46	0.50
Hrs spent in childcare	20.58	13.99	24.40	14.80
Younger siblings	0.34	0.47	0.20	0.50
Older siblings	0.49	0.50	0.45	0.41
Age of mother	36.98	5.21	34.43	5.61
Log(household income)	7.40	0.44	6.94	0.47
Years of education	13.11	2.81	11.93	2.84
N	*366*		*65*	
Adolescents sample				
External locus of control	-0.05	0.95	0.24	1.05
Internal locus of control	-0.04	0.97	-0.25	1.09
Female	0.51	0.50	0.51	0.50
Birth order	1.31	0.56	1.22	0.47
East	0.09	0.28	0.11	0.32
Lower school track	0.10	0.29	0.17	0.38
Middle school track	0.28	0.45	0.27	0.44
Upper school track	0.33	0.47	0.28	0.45
Age of mother	45.07	4.90	43.18	5.08
Log(household income)	10.54	0.38	10.27	0.49
Years of education	11.35	2.41	11.35	2.46
N	*640*		*202*	

Note: Data from the SOEP v26, (2000-2009), pooled data, own calculation.

Appendix B

Table B1: Estimation of socio-emotional behavior and number of maternal partner changes (Panel A of Table 3 – preschool children)

	Socio-emotional behavior	Prosocial behavior	Abnormal behavior: marg. eff.
Number of transitions	1.105*	-0.176	0.051+
	[0.5084]	[0.1496]	[0.0276]
Age of mother	-0.066	-0.004	-0.003
	[0.0657]	[0.0157]	[0.0041]
Years of education mother	-0.207+	0.021	-0.007
	[0.1253]	[0.0319]	[0.0080]
Log(household income)	-0.099	-0.402*	0.023
	[0.7697]	[0.1982]	[0.0483]
Age of child in months	-0.143*	0.040*	-0.003
	[0.0685]	[0.0187]	[0.0044]
Female	-1.568**	0.378*	-0.022
	[0.5647]	[0.1488]	[0.0352]
Hours spent in formal child care	-0.002	0.006	0.001
	[0.0208]	[0.0056]	[0.0014]
Older siblings	-0.945	0.020	-0.014
	[0.6280]	[0.1593]	[0.0375]
Younger siblings	1.201+	-0.147	0.065
	[0.6521]	[0.1771]	[0.0417]
N	421	426	410
R^2	0.080	0.044	
pseudo R^2			0.030

Standard errors in second row, + p < 0.10, * p < 0.05, ** p < 0.01. Own calculations: SOEP v26, (2008-2009).

Table B2: Estimation of locus of control and number of maternal partner changes from birth until age seventeen (Panel A of Table 4 – adolescents)

	External locus of control	Internal locus of control
Number of transitions	0.097*	-0.090+
	[0.0486]	[0.0460]
Age of mother	-0.001	0.001
	[0.0086]	[0.0083]
Years of education mother	-0.035*	-0.042*
	[0.0177]	[0.0176]
Log(household income)	-0.180*	-0.008
	[0.0908]	[0.1025]
Female	-0.071	0.210**
	[0.0727]	[0.0750]
East (region)	0.276**	-0.229+
	[0.1067]	[0.1284]
Migration background	0.275**	-0.038
	[0.0912]	[0.0866]
Birth order	0.090	-0.151*
	[0.0699]	[0.0688]
Reference: Upper school track		
Lower school track	0.192	-0.158
	[0.1469]	[0.1474]
Middle school track	-0.128	0.104
	[0.0819]	[0.0837]
N	682	682
R^2	0.077	0.044

Standard errors in second row, + p < 0.10, * p < 0.05, ** p < 0.01. Own calculations: SOEP v26, (2001-2009).